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EXAMINER	
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2163	

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/787,320	DEKONING ET AL.	
	Examiner	Art Unit	
	Patrick A. Darno	2163	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *06 August 2007*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-17,19-24 and 26-32* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-17,19-24 and 26-32* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *12 August 2004* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

1. No new claims have been added. Claims 18 and 25 are cancelled. Claims 1, 8, 15, 23, and 27 are amended. Claims 1-17, 19-24, and 26-32 are pending in this office action.

Claim Rejections - 35 USC § 102

> (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

2. Claims 1-3, 4-6, 8-17, 19-24, and 26-32 are rejected under 35 U.S.C. 102(e) as being anticipated by U.S. Patent Number 6,981,114 issued to Weibao Wu et al. (hereinafter "Wu").

Claim 1:

Wu discloses a method for creating a snapshot of a virtual volume containing stored data *(Wu: column 4, lines 50-55)* comprising:

identifying a virtual volume comprising a plurality of objects defining a mapping to data in at least one storage device wherein each one of the plurality of objects defining the mapping corresponds to a different portion of the virtual volume *(Wu: column 4, lines 27-35 and column 4, lines 39-43 and column 4, lines 50-55; Note specifically "**original volume may correspond to ... a portion of one or more logical volumes...**")*, and wherein the plurality of objects defining the mapping are distributed across more than one processor in a virtualization layer between at least one host and the at least one storage device *(Wu: Fig. 1 and Fig. 2 and column 4, lines 9-15 and column 4, lines 27-35 and column 4, lines 39-43 and column 4, lines 50-55; Each host (Fig. 1, 102 or Fig. 2, 200) contains a volume manager.)*;

creating a set of partition snapshots for the plurality of objects defining the mapping, with one partition snapshot for each of the plurality of objects defining the mapping, wherein each of the partition snapshots comprises a point-in-time copy of the data in the different portion of the

virtual volume corresponding to the one of the plurality of objects defining the mapping *(Wu: column 4, lines 50-55 and column 5, lines 46-51; Note specifically "Volume manager includes functionality to create a snapshot corresponding to an original volume. The original volume may correspond to ...a portion of the logical volumes...")*; and

generating an overall snapshot of the virtual volume from the set of partition snapshots *(Wu: column 7, lines 17-51; This reference clearly generates an overall snapshot (a desired point-in-time copy of a data volume) from a set of partition snapshots (existing snapshots 240). The reference recites 'reconstructing a deleted snapshot'. However, the reference defines a 'deleted snapshot' as any snapshot, which is no longer a reliable indicator of a point-in-time state of the original volume. Basically, another desired snapshot (overall snapshot) is generated using previously created snapshots (partition snapshots, Wu: column 4, lines 50-55).)*.

Claim 2:

Wu discloses all the elements of claim 1, as noted above, and Wu further discloses a method further comprising distributing the overall snapshot of the virtual volume across more than one processor in the virtualization layer *(Wu: Fig. 1 and Fig. 2 and column 4, lines 9-15 and column 4, lines 27-35 and column 4, lines 39-43 and column 4, lines 50-55; Each host (Fig. 1, 102 or Fig. 2, 200) contains a volume manager. Each volume manager includes functionality to create a snapshot 270 corresponding to a virtual volume or a portion of a virtual volume. Each host can request its own snapshot of a portion of a virtual volume. Fig. 1 shows that there are a plurality of hosts each which can request their own snapshots from a portion of virtualized storage (virtualization layer). Therefore, it is clear that snapshots (objects) are distributed across more than one processor.)*.

Claim 3:

Wu discloses all the elements of claim 1, as noted above, and Wu further discloses wherein each of the set of partition snapshots is created by the processor to which the

corresponding object is distributed *(Wu: Fig. 1 and Fig. 2 and column 4, lines 9-15 and column 4, lines 27-35 and column 4, lines 39-43 and column 4, lines 50-55; The volume manager on the host creates the partition snapshot and the snapshot is distributed to that same host. So the snapshot is created by the processor which it is distributed to.)*.

Claim 4:

Wu discloses all the elements of claim 1, as noted above, and Wu further discloses wherein each partition snapshot further comprises state information related to the state of the different portion of the virtual volume corresponding to the partition snapshot at the time the partition snapshot was created *(Wu: column 9, lines 11-16; Since the system is capable of restoring a snapshot to a desired 'state', the snapshot point-in-time copies must have some kind of state information stored with them in order for the system to restore them to the desired 'state'.)*.

Claim 5:

Wu discloses all the elements of claim 1, as noted above, and Wu further discloses a method comprising:

creating a change log corresponding to the overall snapshot *(Wu: column 6, lines 14-25)*; and

storing, in the change log, changes to the virtual volume made after the overall snapshot is generated *(Wu: column 6, lines 14-18)*.

Claim 6:

Wu discloses all the elements of claim 5, as noted above, and Wu further discloses wherein the change log is a copy on write (COW) change log *(Wu: column 4, lines 63-65)*.

Claim 8:

Wu discloses method for creating a snapshot of a virtual volume containing stored data *(Wu: column 4, lines 50-55)*, comprising:

identifying a virtual volume comprising a plurality of objects defining a mapping to data in at least one storage device, wherein each one of the plurality of objects defining the mapping corresponds to a different portion of the virtual volume *(Wu: column 4, lines 27-35 and column 4, lines 39-43 and column 4, lines 50-55; Note specifically "**original volume may correspond to** ... **a portion of one or more logical volumes**...")*, and wherein the plurality of objects defining the mapping are distributed across more than one processor in a virtualization layer between at least one host and the at least one storage device *(Wu: Fig. 1 and Fig. 2 and column 4, lines 9-15 and column 4, lines 27-35 and column 4, lines 39-43 and column 4, lines 50-55; Each host (Fig. 1, 102 or Fig. 2, 200) contains a volume manager.)*;

creating a set of partition snapshots for the plurality of objects defining the mapping, with one partition snapshot for each of the plurality of objects defining the mapping, wherein each of the partition snapshots comprises a point-in-time copy of the data in the different portion of the virtual volume corresponding to the one of the plurality of objects defining the mapping *(Wu: column 4, lines 50-55 and column 5, lines 46-51; Note specifically "Volume manager includes functionality to **create a snapshot corresponding to an original volume. The original volume may correspond to ...a portion of the logical volumes**...")*; and

specifying, for each of the partition snapshots, a change log volume corresponding to the different portion of the virtual volume corresponding to the object for the partition snapshot, for storing changes to the portion of the virtual volume *(Wu: column 6, lines 14-25 and column 7, lines 26-29; If the system actually chooses the modification log to use, the modification must have been chosen or specified in some manner.)*;

generating an overall snapshot of the virtual volume from the set of partition snapshots *(Wu: column 7, lines 17-51; This reference clearly generates an overall snapshot (a desired point-in-time copy of a data volume) from a set of partition snapshots (existing snapshots 240). The reference recites 'reconstructing a deleted snapshot'. However, the reference defines a 'deleted snapshot' as any snapshot, which is no longer a reliable indicator of a point-in-time state of the original volume. Basically, another desired snapshot (overall snapshot) is generated using previously created snapshots (partition snapshots, Wu: column 4, lines 50-55).)*; and

storing, in each change log volume, changes made to the corresponding portion of the virtual volume after the overall snapshot is generated *(Wu: column 6, lines 14-25; All changes (modifications) to all snapshots are stored in the change log (modification log).).*

Claim 9:

The method of claim 8, wherein the change log volume is maintained by the processor to which the corresponding object is distributed *(Wu: Fig. 1 and Fig. 2 and column 6, lines 14-25; The modification manager on the host is maintained by the processor for the host. And the object (snapshot) is distributed to the host, as requested by the volume manager.).*

Claim 10:

Wu discloses all the elements of claim 8, as noted above, and Wu further discloses further comprising:

receiving a request for data stored in the virtual volume *(Wu: column 9, lines 45-61)*;

determining, from the change log volume corresponding to the portion of the virtual volume containing the requested data, whether the requested data has changed since the snapshot was generated *(Wu: column 6, 14-18)*;

retrieving the requested data from the change log volume corresponding to the portion of the virtual volume containing the requested data when it is determined that the requested data has changed since the overall snapshot was generated *(Wu: column 7, lines 17-51 and column 9, lines 45-61; When it is determined that the snapshot has changed, a new one is created using the change logs. If no change has been made to the snapshot, there is no need to invoke the change logs. This reference clearly shows retrieving data from a change (modification) log in order to retrieve the most recent modifications to a snapshot. See rejection of claim 1 for explanation of 'overall snapshot' vs. 'partition snapshots'.)*; and

retrieving the requested data from the source volume corresponding to the portion of the virtual volume containing the requested data, when it is determined that the requested data has not changed since the overall snapshot was generated *(Wu: column 4, lines 40-43 and column 9, lines 45-61; The only time change logs are invoked in the Wu reference is when modifications have been made to a storage volume or snapshot. At all other times, the primary (source) volumes or snapshots are accessed. See rejection of claim 1 for explanation of 'overall snapshot' vs. 'partition snapshots'.).*

Claim 11:

Wu discloses all the elements of claim 10, as noted above, and Wu further discloses a method comprising:

retrieving the requested data from the overall snapshot, when it is determined that the requested data has not changed since the overall snapshot was generated *(Wu: column 4, lines 40-43 and column 9, lines 45-61; The only time change logs are invoked in the Wu reference is when modifications have been made to a storage volume or snapshot. At all other times, the primary (source) volumes or snapshots are accessed.).*

Claim 12:

Wu discloses all the elements of claim 8, as noted above, and Wu further discloses a method comprising distributing the overall snapshot of the virtual volume across more than one processor in the virtualization layer *(Wu: Fig. 1 and Fig. 2 and column 4, lines 9-15 and column 4, lines 27-35 and column 4, lines 39-43 and column 4, lines 50-55; Each host (Fig. 1, 102 or Fig. 2, 200) contains a volume manager. Each volume manager includes functionality to create a snapshot 270 corresponding to a virtual volume or a portion of a virtual volume. Each host can request its own snapshot of a portion of a virtual volume. Fig. 1 shows that there are a plurality of hosts each which can request their own snapshots from a portion of virtualized storage (virtualization layer). Therefore, it is clear that snapshots (objects) are distributed across more than one processor.).*

Claim 13:

Wu discloses all the elements of claim 8, as noted above, and Wu further discloses wherein:

each of the plurality of partition snapshots is created by the processor to which the corresponding object is distributed *(Wu: Fig. 1 and Fig. 2 and column 4, lines 9-15 and column 4, lines 27-35 and column 4, lines 39-43 and column 4, lines 50-55; The volume manager on the host creates the partition snapshot and the snapshot is distributed to that same host. So the snapshot is created by the processor which it is distributed to.).*

Claim 14:

Claim 14 is rejected under the same reasons set forth in the rejection of claim 4.

Claim 15:

Wu discloses a system for creating a snapshot of a virtual volume *(Wu: column 4, lines 50-55)* comprising:

a plurality of storage devices storing data corresponding to a host *(Wu: Fig. 1, 104A...104n)*;

a means for providing a virtualization layer between the host and the plurality of storage devices, the virtualization layer comprising a plurality of objects defining a mapping to data in the storage devices, wherein each one of the plurality of objects defining the mapping corresponds to a different portion of the virtual volume *(Wu: column 4, lines 27-35 and column 4, lines 39-43 and column 4, lines 50-55; Note specifically "**original volume may correspond to ... a portion of one or more logical volumes**...")*, and wherein the plurality of objects defining the mapping are distributed across more than one processor in the virtualization layer between the host and the plurality of storage devices *(Wu: Fig. 1 and Fig. 2 and column 4, lines 9-15 and column 4, lines 27-35 and column 4, lines 39-43 and column 4, lines 50-55; Each host (Fig. 1, 102 or Fig. 2, 200) contains a volume manager.)*;

a means for providing a snapshot layer *(Wu: Fig. 2, 240)* between the host and the virtualization layer, the snapshot layer comprising:

a partition snapshot for each of the plurality of objects defining the mapping in the virtualization layer *(Wu: column 4, lines 27-35 and column 4, lines 39-43 and column 4, lines 50-55; Note specifically that the volume manager can create a snapshot of a whole volume or just a portion of a volume ("**original volume may correspond to ... a portion of one or more logical volumes**...").)*, the partition snapshot object having references to (1) the one of the plurality of objects defining the mapping in the virtualization layer, (2) a COW point-in-time copy of the data in the different portion of the virtual volume *(Wu: column 4, lines 63-65)*, and (3) a change log corresponding to the portion of the virtual volume *(Wu: column 4, lines 61-67 and column 5, lines 46-51 and column 6, lines 14-25)*, and

an overall snapshot of the virtual volume comprising references to each partition snapshot object corresponding to one of the plurality of objects defining the mapping comprising the virtual volume *(Wu: column 6, lines 38-44; Note specifically that the 'snapshot manger' maintains a history of each snapshot created and can identify (reference) each snapshot. See rejection of claim 1 for explanation of 'overall snapshot' vs. 'partition snapshots'.)*; and a means for generating the overall snapshot object *(Wu: column 7, lines 17-51; This reference clearly generates an overall snapshot (a desired point-in-time copy of a data volume) from a set of partition snapshots (existing snapshots 240). The reference recites 'reconstructing a deleted snapshot'. However, the reference defines a 'deleted snapshot' as any snapshot, which is no longer a reliable indicator of a point-in-time state of the original volume. Basically, another desired snapshot (overall snapshot) is generated using previously created snapshots (partition snapshots, Wu: column 4, lines 50-55).)*.

Claim 16:

Claim 16 is rejected under the same reasons set forth in the rejection of claim 4.

Claim 17:

Wu discloses a claim 15, as noted above, and Wu further discloses wherein each change log stores changes made to the corresponding portion of the virtual volume after the snapshot layer is generated *(Wu: column 6, lines 14-18)*.

Claim 19:

Wu discloses all the elements of claim 15, as noted above, and Wu further discloses wherein the partition snapshot objects are distributed across the multiple processors in the virtualization layer *(Wu: Fig. 1 and Fig. 2 and column 4, lines 9-15 and column 4, lines 27-35 and column 4, lines 39-43 and column 4, lines 50-55)*.

Claim 20:

Wu discloses all the elements of claim 15, as noted above, and Wu further discloses a system further comprising:

an interface enabling the host to view a point-in-time representation of the data by accessing the overall snapshot object *(Wu: column 4, lines 40-43 and column 6, lines 38-44).*

Claim 21:

Wu discloses all the elements of claim 15, as noted above, and Wu further discloses a system comprising:

an interface enabling the host to specify when the snapshot layer is created *(Wu: column 4, lines 40-43 and column 6, lines 48-55; The first reference discloses user applications used to perform operations carried out by the Wu reference. The second reference shows that the creation of snapshots (snapshot layer) can be set at different frequencies. There must be some means provided in the user applications that allow for the user to change set the frequency of snapshot creation and therefore allowing the user of the host computer to specify when a snapshot is created.).*

Claim 22:

Wu discloses all the elements of claim 15, as noted above, Wu further discloses wherein the snapshot layer is created on a periodic basis *(column 6, lines 48-55; Note the reference shows the snapshots can be generated daily or weekly.).*

Claim 23:

Claim 23 is rejected under the same reasons set forth in the rejection of claim 1.

Claim 24:

Claim 24 is rejected under the same reasons set forth in the rejection of claim 3.

Claim 26:

Claim 26 is rejected under the same reasons set forth in the rejection of claim 5.

Claim 27:

Claim 27 is rejected under the same reasons set forth in the rejection of claim 1.

Claim 28:

Claim 28 is rejected under the same reasons set forth in the rejection of claim 3.

Claim 29:

Claim 29 is rejected under the same reasons set forth in the rejection of claim 4.

Claim 30:

Claim 30 is rejected under the same reasons set forth in the rejection of claim 5.

Claim 31:

Claim 31 is rejected under the same reasons set forth in the rejection of claim 4.

Claim 32:

Claim 32 is rejected under the same reasons set forth in the rejection of claim 5.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

3. Claim 7 is rejected under 35 U.S.C. 103(a) as being unpatentable over Wu and further in view of U.S. Patent Number 6,173,293 issued to Chandramohn A. Thekkath et al. (hereinafter "Thekkath").

Claim 7:

Wu discloses all the elements of claim 5, as noted above, but Wu does not explicitly disclose wherein snapshot cannot be changed after it is generated.

However, Thekkath discloses wherein the partition snapshot cannot be changed after it is generated *(Thekkath: column 13, lines 8-14)*.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the teachings of Wu with the teachings of Thekkath noted above for the purpose of not allowing a snapshot to be changed after it is generated *(Thekkath: column 13, lines 8-14)*. The skilled artisan would have motivated to improve the teachings of Wu per the above such that access to would be controlled so that any user's view of any file at any one time is consistent any other user's view *(Thekkath: column 3, lines 33-37)*.

Response to Arguments

Applicant Argues:

Wu does disclose each and every element of Applicants' claimed invention. Specifically, Wu does not disclose the feature recited in claim 1,"identfying a virtual volume comprising a plurality of objects defining a mapping to data in at least one storage device, wherein each one of the plurality of objects defining the mapping corresponds to a different portion of the virtual volume, and wherein the plurality of objects defining the mapping are distributed across more than one processor in a virtualization layer between at least one host and the at least one storage device."

Examiner Responds:

Examiner is not persuaded. Wu discloses identifying a virtual volume comprising a plurality of objects defining a mapping to data in at least one storage device, wherein each one of the plurality of objects defining the mapping corresponds to a different portion of the virtual volume *(Wu: column 4, lines 27-35 and column 4, lines 39-45 and column 4, lines 50-55; Note specifically "original volume may correspond to...a portion of one or more logical volumes...")*, and wherein the plurality

of objects defining the mapping are distributed across more than one processor in a virtualization layer between at least one host and the at least one storage device *(Wu: Fig. 1 and Fig. 2 and column 4, lines 9-15 and column 4, lines 27-35 and column 4, lines 39-43 and column lines 50-55).*

Portions of the Wu reference which the Examiner cites as disclosing the above claim limitations are now reproduced below:

> The volume manager 210 of Fig. 2 includes functionality to virtualize physical storage accessible by applications running on primary host 200. As used herein, the term "volume manager" broadly refers to the host software that selects and combines storage space from more than one physical storage device into a logical volume. (Wu: column 4, lines 27-32)
>
> As illustrated in Fig. 2, data may span multiple volumes, depicted as primary volumes 220A-220n. Each primary volume 220 may be accessed by user applications (e.g., database applications) through the virtualization functionality provided by volume manager 210. It is noted that each primary volume 220 corresponds to a partitioning of physical storage such as the storage of storage devices 104 of Fig. 1. A volume may be formed by a portion of the overall storage of a physical device, by the storage of an entire physical device, or by the storage of multiple physical devices combined. For example, each primary volume may include an array of storage devices 103, as desired. (Wu: column 4, lines 39-50)

As can be easily seen from the portions of the Wu reference reproduced above, Wu allows the user to access physical storage with the use of storage virtualization. The Examiner asserts that there must be a plurality of objects, each of which map the physical layer to the virtual layer, and vice versa. If there was no mapping defined with the use of some type of object, then there would be no way for the user to access the underlying physical representation of data with the virtual representation of data. And naturally, this layer of mapping data can be referred to as a virtualization layer. Furthermore, Wu makes it clear in the second portion cited

above that the virtual mapping of storage devices can span only a portion of a single device, an entire single device, or a plurality of storage devices (and therefore a plurality of CPUs.).

From the portions of the Wu reference cited above, it appears that each and ever element of the Applicant's claimed invention is either disclosed or suggested by the prior art of record. Therefore, the rejections under 35 U.S.C. 102(e) are sustained.

Applicant Argues:

While Wu discloses virtualization, which must have some mapping to data in storage devices, Wu nowhere discloses how the mapping is accomplished (such as with "objects defining a mapping," as recited in claim 1) or where the objects might be located ("the plurality of objects defining the mapping are distributed across more than one processor in the virtualization layer," as recited in claim 1).

Examiner Responds:

Examiner is not persuaded. The Applicant is correct with respect to the fact that Wu discloses virtualization, which must have some mapping to data in storage devices. The Examiner asserts that some type of "object" must define this mapping. While the Applicant's invention as disclosed in the specification may have a unique type of mapping, this aspect of the invention is not reflected in the claims. The term "object" is extremely broad, and the Examiner remains convinced that the mapping that exists between the virtual volume and the physical volume could be interpreted as an "object". And this mapping can then be referred to as a virtualization layer.

Since it appears that the cited prior art either discloses or suggests each and every element of the Applicant's claimed invention, the rejections under 35 U.S.C. 102(e) and 35 U.S.C. 103(a) are sustained.

Applicant Argues:

Additionally, in the Office Action, Wu appears to confuse "objects defining a mapping to data in at least one storage device" with snapshots. See e.g. Office Action at 4 ("Therefore, it is clear that snapshots (objects) are distributed across more than one processor."). Applicant respectfully refers to Fig. 7B of the instant Application, which shows an exemplary embodiment of "objects defining a mapping" (i.e. T1 partitioning object 270, T2 striping object 705, etc.). Each of Applicant's snapshots "comprises a point-in-time copy of the data in the portion of the virtual volume," as recited in claim 1, and are separate elements in claim 1 from "objects defining a mapping to data in at least one storage device." By treating "objects" as "snapshots," the Office Action does not show that Wu discloses "identifying a virtual volume comprising a plurality of objects defining a mapping to data in at least one storage device, wherein each one of the plurality of objects defining the mapping corresponds to a different portion of the virtual volume, and wherein the plurality of objects defining the mapping are distributed across more than one processor in a virtualization layer between at least one host and the at least one storage device," as required by claim 1.

Examiner Responds:

Examiner is not persuaded. The Wu reference does not confuse "objects defining a mapping to data in at least one storage device" with snapshots. The Examiner misinterpreted the previous version of claims to be a snapshot object distributed over a plurality of storage devices. So a snapshot of a virtual volume, which spans multiple physical devices could be interpreted as a snapshot distributed across a plurality of storage devices.

However, the newly amended claims presented by the Applicant have clearly distinguished between "objects defining a mapping to data in at least one storage device" and snapshots. The Wu reference clearly discloses snapshots *(see at least Wu: column 4, line 60 – column 5, line 27 and column 6, line 38 – column 7, line 5)* and "objects defining a mapping to data in at least one storage device" *(see at least Wu: column 4, lines 27-50; The "objects defining a mapping" is the data that maps the virtual volume to the physical volume(s).)*.

Since it appears that the cited prior art either discloses or suggests each and every element of the Applicant's claimed invention, the rejections under 35 U.S.C. 102(e) and 35 U.S.C. 103(a) are sustained.

Examiner Notes:

If any of the Examiner's rejections or viewpoints remain unclear, the Examiner urges the Applicant to contact the Examiner to set up an interview to discuss the claims, prior art, and/or rejections made.

Contact Information

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Patrick A. Darno whose telephone number is (571) 272-0788. The examiner can normally be reached on Monday - Friday, 9:00 am - 5:30 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Don Wong can be reached on (571) 272-1834. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

PAD

Hong Vy
For SPE DON WONG

Patrick A. Darno
Examiner
Art Unit 2163